

NREL In Focus



Admiral Richard H. Truly



Dr. Dan E. Arvizu

Passing the Torch

NREL welcomed new director Dr. Dan E. Arvizu January 15, 2005, and honored the accomplishments of retiring director Richard H. Truly.

In his seven years at NREL's helm, Truly established the National Bioenergy Center at NREL; brought the hydrogen systems integration function to the Laboratory; secured a key for NREL in the Center of Excellence for exploratory research in hydrogen storage; began construction of the Science and Technology Facility, NREL's first major new building in more than a decade; and created Sustainable NREL, a campus-wide effort to incorporate sustainable energy practices throughout the workplace. Streamlining management systems was another priority that bore significant benefits and resulted in more funds directed toward laboratory R&D.

"Science and engineering have a magical quality about them, in that they are all about imagining a future that gets created by those lucky enough to have their ladle in the broth," Truly said in announcing his retirement. "I feel a deep privilege to have been a small part of NREL's successes over these years."

Dan Arvizu is NREL's eighth director in its 27-year history. In addition to his

NREL appointment, Arvizu joins Midwest Research Institute (MRI) executive management and assumes a senior vice president position. NREL is operated for the Department of Energy by MRI and Battelle.

Prior to joining NREL, Arvizu held prominent positions at CH2M Hill from 1998 to 2004. Most recently, he served as senior vice president and chief technology officer overseeing technology development and acquisitions for seven major business groups, with more than \$2.5 billion in annual revenue. Arvizu spent more than 20 years managing energy research programs at Sandia National Laboratories, including supervising the Photovoltaic Cell Research and Concentrator Division. Arvizu was credited with expanding the laboratory's technology transfer efforts, first as director of the Technology Commercialization Center and later as director of the Advanced Energy Technology and Policy Center.

In 2004, Arvizu was appointed by President George W. Bush to serve on the National Science Board, which is the governing board of the National Science Foundation. He also serves on several university advisory boards, on the board of directors of the Hispanic Engineers National Achievement Awards Corp., and on the board of advisors for the Greater Denver Metro Area Salvation Army.

Arvizu has served on numerous other boards and advisory committees, including the National Coal Council, the Army Science Board, the National Academies of Sciences and Engineering, the G8 International Renewable Energy Task Force, and the Council on Competitiveness.

Breaking Ground for New Facility

NREL broke ground in July to signal the start of construction of the new Science and Technology Facility (S&TF). The 71,000 square foot, energy-efficient building will include laboratory space, offices, and a lobby. Situated at the foot of South Table Mesa on NREL's main campus, the S&TF will be connected by an elevated bridge with the Solar Energy Research Facility. The new building will expand NREL's capabilities in photovoltaics, hydrogen, solid-state lighting, basic sciences, and nanotechnology and will reduce barriers and time delays associated with transferring technology from R&D to industry.

National leaders present at the groundbreaking included U.S. Senator Wayne Allard and Congressman Bob Beauprez, who extolled NREL as an asset to Colorado and the nation, and praised the project as a beneficial new resource for ensuring U.S. energy security.

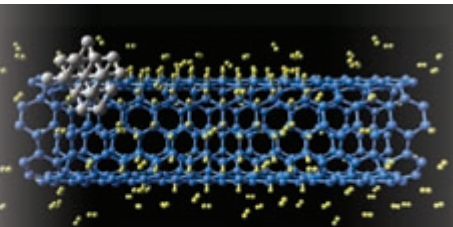
"This new facility will . . . hasten the day when we reach our goal of providing . . . clean, affordable energy solutions that can be used by all Americans," said David Garman, DOE's acting under secretary for energy, science, and the environment and assistant secretary for energy efficiency and renewable energy.

NREL's Science and Technology Facility, which is scheduled for completion in 2006, will be NREL's first major new facility in a decade. The S&TF will be used for R&D in photovoltaics, hydrogen, solid-state lighting, basic sciences, and nanotechnology.



Construction began in earnest in early 2005, with completion expected in late 2006.

The value of the construction subcontract is nearly \$18 million. The total value of the project, including equipment and furnishings, is approximately \$28 million. The M.A. Mortenson Company signed the contract to build NREL's first major new facility in a decade.



An important concept for hydrogen storage that NREL is exploring is a single-wall carbon nanotubes (blue), shown here with hydrogen (yellow) diffusing to the lattice of the nanotube in the presence of a catalyst (silver).

NREL Named to Hydrogen Center of Excellence

NREL was named by DOE to play a key role in one of three "Centers of Excellence" for exploratory research in hydrogen storage and nanostructured carbon-containing materials. The other centers—to study chemical and metal hydrides for hydrogen storage—have Los Alamos National Laboratory and Sandia National Laboratories in key roles. Each center will lead R&D on different material systems to address major technical barriers to storing hydrogen on-board cars, vans, and light trucks. The goal is to develop systems that will store enough hydrogen to enable a driving range greater than 300 miles without impacting cargo or passenger space.

NREL is in the Center of Excellence for carbon-based materials and will lead research on carbon nanotubes, nanofibers, and aerogels, alkali metal intercalated carbons; and other novel carbon-based materials. In this endeavor, it will partner with industry (Air Products and Chemicals Inc.); universities (California Institute of Technology, Duke University, Penn State University, Rice University, University of Michigan, University of North Carolina, and

University of Pennsylvania); and other national laboratories (Lawrence Livermore National Laboratory, National Institutes of Standards and Technology, and Oak Ridge National Laboratory).

NREL Wins ISO Certification

NREL's National Center for Photovoltaics received ISO (International Organization for Standardization) 17025 accreditation in recognition of the Center's stringent standards in calibrating secondary photovoltaic reference cells. These reference cells are used by calibration and testing laboratories and by PV manufacturers, who can now be assured that their calibrations and measurements are traceable, via NREL's certified reference cells, to national and international standards.

The ISO 17025 accreditation was granted by the American Association for Laboratory Accreditation. Only one other laboratory in the world—the European Solar Test Installation—has the same accreditation, according to NREL scientist Keith Emery. Other labs have accreditation in similar types of calibration.

ISO 17025 accreditation is awarded in many industries, each with its own standards. It is a recognition sought by testing and calibration laboratories, inspection bodies, proficiency testing providers, and reference material producers. To win such accreditation, a laboratory must have a quality system at three levels of staff: top management, supervisors, and operating personnel. Quality procedures must be described in a manual. The laboratory must have a policy and procedures for corrective actions in the event of non-conforming data results.

NREL Theorist Recognized for High-Citation Impact

Dr. Alex Zunger, NREL research fellow, is the co-author of a paper that has had the fifth-highest citation impact in the *Physical Review* during the past 110 years, according to a recent analysis of papers appearing in the journal.

The analysis, performed by Sydney Redner of Boston University, includes more than 3 million citations from more than 329,000 manuscripts appearing in the prestigious physics journal from 1893 through 2003.

Citation impact is based on the number of citations to a publication times the average age of these citations. Such a measure emphasizes publications that have influence over an extended period of time.

Zunger's achievement is based on his work with John Perdew on "Self-interaction Correction to the Density Functional Approximation for Many-Electron Systems" published in *Phys. Rev. B* 23, 5048 (1981). Their paper established a fundamental treatment of Walter Kohn's and Lu Sham's celebrated "Density Functional Theory" (ranked number one in Redner's analysis). This opened up the field of using the quantum theory of Kohn and Sham to predict optical, structural, and energetic properties of many molecules and solids.

Zunger's Solid State Theory group at NREL has used this method during the past 20 years to predict and analyze the properties of PV materials and to study spontaneous ordering, alloy bowing, and, more recently, the properties of nanostructures.

Dr. Zunger has been with NREL for 25 years and has been a research fellow at the Laboratory since 1991. He has authored and co-authored more than 400 journal articles. According to a recent study by the Institute of Scientific Information, other papers by Zunger place him in 39th place (of 50,000 physicists reviewed) in terms of citations by all physics journals in the years 1987–1997.



NREL research fellow Alex Zunger co-authored one of the highest-ranked papers (in terms of citation impact) ever published in *Physical Review*.